

Curatorial > PROBES

In this section, RWM continues its line of programmes devoted to exploring the complex map of sound art from different points of view, organised into curatorial series.

Curated by Chris Cutler, **PROBES** takes Marshall McLuhan's conceptual contrapositions as a starting point to analyse and expose the search for a new sonic language made urgent after the collapse of tonality in the twentieth century. The series looks at the many probes and experiments that were launched in the last century in search of new musical resources, and a new aesthetic; for ways to make music adequate to a world transformed by disorientating technologies.

Curated by Chris Cutler

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At the start of the seventies, Chris Cutler co-founded **The Ottawa Music Company** – a 22-piece Rock composer's orchestra – before joining British experimental group **Henry Cow**, with whom he toured, recorded and worked in dance and theatre projects for the next eight years. Subsequently he co-founded a series of mixed national groups: **Art Bears**, **News from Babel**, **Cassiber**, **The (ec) Nudes**, **p53** and **The Science Group**, and was a permanent member of American bands **Pere Ubu**, **Hail** and **The Wooden Birds**. Outside a succession of special projects for stage, theatre, film and radio he still works consistently in successive projects with **Fred Frith**, **Zeena Parkins**, **Jon Rose**, **Tim Hodgkinson**, **David Thomas**, **Peter Blegvad**, **Daan Vandewalle**, **Ikue Mori**, **Lotte Anker**, **Stevan Tickmayer**, **Annie Gosfield** and spectralists **Iancu Dumitrescu** and **Ana Maria Avram**. He is a permanent member of **The Bad Boys** (Cage, Stockhausen, Fluxus &c.) **The Artaud Beats** and **The Artbears Songbook**, and turns up with the usual suspects in all the usual improvising contexts. As a soloist he has toured the world with his extended, electrified, kit.

Adjacent projects include commissioned works for radio, various live movie soundtracks, *Signe de Trois* for surround-sound projection, the daily year-long soundscape series *Out of the Blue Radio* for Resonance FM, and **p53** for Orchestra and Soloists.

He also founded and runs the independent label **ReR Megacorp** and the art distribution service **Gallery and Academic** and is author of the theoretical collection **File Under Popular** – as well as of numerous articles and papers published in 16 languages. www.ccutler.com/ccutler

PROBES #31

In the late nineteenth century two facts conspired to change the face of music: the collapse of common-practice tonality (which overturned the certainties underpinning the world of art music), and the invention of a revolutionary new form of memory, sound recording (which redefined and greatly empowered the world of popular music). A tidal wave of probes and experiments into new musical resources and new organisational practices ploughed through both disciplines, bringing parts of each onto shared terrain before rolling on to underpin a new aesthetics able to follow sound and its manipulations beyond the narrow confines of 'music'. This series tries analytically to trace and explain these developments, and to show how, and why, both musical and post-musical genres take the forms they do. In **PROBES #31** we begin to consider evolutionary pressures and invented instruments and follow the twists and turns that led the xylophone out of Asia and Africa, spun it around the world and metamorphosed it into the vibraphone; with a coda from the *intonarumori*.

01. Transcript. Studio version

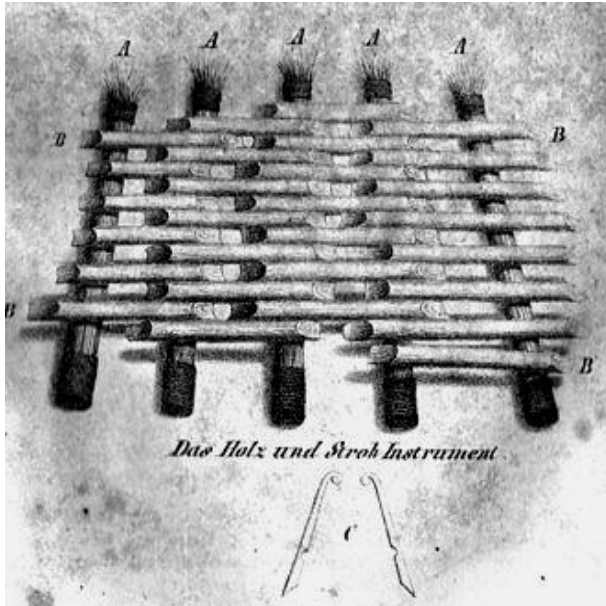
[Gregorio Paniagua, 'Anakrousis', 1978]

Having seen how existing instruments have been extended, modified and repurposed, we now turn to instruments that have been purposefully designed, restricting ourselves initially to acoustic technologies. From as far back as we know, performers and professional instrument makers have been modifying and customizing instruments in response to both individual and cultural pressures. The constant has always been that musical forms and musical instruments have evolved together. In fact they form an ecology. So, in the tenth century, when music was linear, melodic and mediated by biological memory, most instruments came in a single form – and they just did what they did but – by the early seventeenth century when the German writer and composer Michael Praetorius compiled his *Syntagma Musicum*₁, they had mutated into entire families; not only the recorder – which had now speciated into treble, alto, tenor and bass – but also the viol, the flute, the shawm, the trombone and the violin – all now available in sizes that satisfied the logic of a music increasingly shaped by the organizational demands of *writing*, on the one hand, and on the rapid growth and importance of *music at court*, on the other. Because, by the seventeenth century, secular court entertainment had become a fluid and remunerative form of indoor – and therefore potentially quite subtle and refined – music-making that was free both from the functional restraints of religious ideology and the less discerning – and more raucous – demands of collective outdoor merry-making.

Notation had shown composers notes that could be written down but that not all instruments could reproduce – opening up an attractive niche for larger or smaller varieties of the same instrument that could offer composers otherwise unattainable pitches, while at the same time retaining characteristic timbres. In its relative autonomy, the secular aristocratic milieu offered composers ideal conditions – both acoustical and cultural – to explore the possibilities of consorts, instrumental polyphony and other harmonious confections in which the stave as much as the instrument inspired their imaginations. Projecting forward, this ecology leads on to the baroque – and then the romantic – orchestra and alongside them, an ever greater stratification and standardisation of instruments.

This process, we might say, is the default, or resting state, of instrumental evolution – and we can understand its products as the organic progeny of *need*; in this case, the need for composers to have access to particular timbres and sonorities across an extended range of pitches. A need to bring the world of instruments into ever-closer alignment with the propositional potential inherent in musical notation.

[Travel sound]



[Xylocordéon]

A more radical kind of innovation may arise by way of happenstance and opportunity. For example, instruments in the baggage of sailors or immigrants that find a new niche for themselves in unfamiliar settings – so long as the cultural ecology can support them. Take the xylophone, for instance – a native first of Asia and then of Africa – whose first sighting in Europe was in 1511, when Arnolt Schlicht₂ catalogued it as a primitive East Europe folk instrument. After that we hear little of it for the next three hundred years, when a klezmer virtuoso, Josef Gusikov – who, I suppose by our standards was something like a novelty entertainer – created a fashionable buzz in bourgeois European concert halls with bravura xylophone performances that drew comment from the likes of Chopin, Liszt and Mendelssohn. One man, it seems, managed to redefine the status of the xylophone in polite society – and change its destiny. Camille Saint-Saëns was the first to incorporate a xylophone into an orchestral work, scoring one into his 1874 ‘Danse Macabre’ as a musical metonym for rattling bones. This was already not Gusikov’s xylophone, but one of the many variations speculatively offered up in the wake of his celebrity by instrument makers who began immediately to pitch new designs to their bourgeois clientele. Saint-Saëns probably used a tryphone, the work of a Parisian instrument builder, Charles Try – but there were certainly others in contention. And once it had been accepted as a junior member of the classical orchestra, the xylophone was refined and adapted to meet the needs of its new masters; which is why the one we know today is so different from Gusikov’s: his was arranged like a cimbalom, in fifteen rows, with the keys resting on parallel rolls of hay; ours is arranged in two rows, and fitted with resonators to amplify its tone.

For the next century, the xylophone performed adequately and kept out of the limelight; it was only in the highly volatile musical climate of early twentieth century America that it finally – and accidentally – came into its own. After first being adopted as a ragtime instrument, xylophones then began to turn up in family homes as an affordable substitute for the piano, and its popularity was only enhanced by the fact that it turned out to be one of the very few instruments that could both record and reproduce well on the rudimentary media of its day. Here, for instance, is the virtuoso Charles Daab’s 1910 cylinder recording of the ‘Cameo Polka’.

[Charles Daab, ‘Cameo Polka’ (cylinder release), 1910]

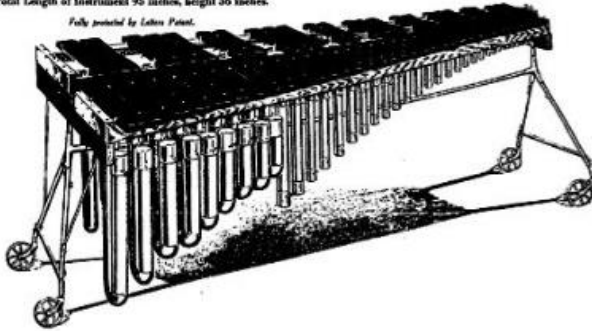
It was the popularity of the xylophone that led the J.C. Deagan company – a major manufacturer of contemporary xylophones – to expand. Since there was no call to modify the xylophone itself, they tried instead to extend the family. First they looked at the marimba, an instrument unknown in Europe or North America but extremely popular in South America. This too was a direct descendent of the xylophone, though it had evolved in a very different way and under very different circumstances.

The first evidence of a xylophone in Africa was in thirteenth century Mali. Some time after that, a variety built with hollow gourds hanging underneath the bars, appeared in central Africa – in which the pitch of the gourd and the pitch of the bar were perfectly matched, to add strength and resonance to the sound. Mirlitons were also added – a mirliton is a thin membrane you can fix to something to make it buzz – like a Kazoo, or a comb and paper. It was this Central African marimba – or at least knowledge of it – that travelled with the slave trade to South America in the early sixteenth century, where it continued to evolve until it came close to its current form in late nineteenth century Mexico and Guatemala. Although touring marimba ensembles occasionally made it into North America, it wasn’t until a Guatemalan, Sebastian Hurtado – whose group used folk instruments modified to produce western chromatic scales – caused a minor sensation at the 1915 Chicago World’s Fair, that the marimba finally entered North American popular consciousness. J.C. Deagan and Co., mindful of their success with the xylophone, decided to market one and see what happened. In the version that flourished, Deagan replaced the resonators with tuned metal tubes and removed the mirlitons. But here’s an earlier version that never caught on, that was based on the Mexican nabimba – in which the mirlitons stayed in place. Only a handful of these were made and virtually none survived – but here’s one that did, demonstrated for Antiquity Music by Ken McGrath.

[Nabimba demonstration by Ken McGrath (excerpt), 2013]



5 OCTAVE DEAGAN NABIMBA
RANGE, 5 OCTAVES, C 4 TO C 64 CHROMATIC
Total Length of Instrument 95 inches, height 36 inches.



[Nabimba]

While the nabimba failed in the marketplace, the marimba succeeded, rapidly joining the xylophone on the vaudeville and popular entertainment circuits. And, although the Australian composer Percy Grainger called for one in his 1916 composition 'In a Nutshell' – he acted alone. It would be a quarter of a century before the American composer, Paul Creston, wrote a concertino for the instrument. And that didn't make much impression; reviewers clearly found the novelty aspect of the xylophone – and by association the marimba – hard to overcome. By 1947, an initially dubious Darius Milhaud had been persuaded to write a double concerto for the marimba and the vibraphone – but this too, though well enough received, was regarded with suspicion – rather unfairly I think. But it wasn't until Robert Kurka's 1956 concerto – commissioned by Vida Chenoweth, a marimba virtuoso in need of repertoire – that the instrument finally won critical respect – in no small part thanks to Chenoweth's insistence that Kurka take no account of difficulty in his writing. Whatever you write, she said, I'll find a way to play.

[Robert Kurka, 'Concerto for Marimba' (excerpt from original radio broadcast, soloist Vida Chenoweth), 1956]

In another line of descent from the same ancestral root came a genuinely original instrument – the vibraphone, or vibraharp. It seemed at the time less radical than it was; just a metal variant of the marimba. But sometimes just a single genetic twist can turn a difference in quantity, into a difference in quality.

[Footnote]

Metallophones – which are struck metal bars – are not mentioned in Europe before the middle of the eighteenth century, when they arrived from Indonesia – and were quickly adopted as a substitute for bells. Handel used a keyboard-operated metallophone in 1739₃ in his oratorio 'Saul', and Mozart called for a simpler manual model in 1791, for the 'Magic Flute'. From the keyboard version came – by a tortured route – the celesta; and from the manual version, the modern glockenspiel.⁴

[Footnote]

Here is a short excerpt from Darius Milhaud's 'Concerto for Marimba and Vibraphone', composed in 1947 and, for me, one of the best integrated.

[Darius Milhaud, 'Concerto for Marimba and Vibraphone' (excerpts), 1947]

What's genuinely new about the vibraharp – which is otherwise just a marimba-celesta hybrid – is the electrically operated rotating disk inserted into the upper part of each resonator to create the variable vibrato that defines the sound. The original vibraphone was designed by Hermann Winterhoff, who invented and applied a series of different vibrato devices to a three-octave metal marimba built by the Leedy drum company – J.C. Deagan's prime competitor – in 1921. Deagan then commissioned his own designer, Henry Schluter, to make a variant. Schluter made significant improvements, replacing the steel bars with better sounding aluminium, and introducing a foot-controlled damping pad. The Deagan vibraharp – which was the instrument that ultimately succeeded – was launched in 1928 – again pitched initially at the novelty market. But by the end of the decade, dance bands and jazz musicians had taken it up – in particular the percussionist Paul Barbarin, who we hear, briefly, on this 1930 Louis Armstrong recording, 'Song of the Islands', where it's used to add colour. There's no thought yet that this might be a soloing instrument.

[Louis Armstrong, 'Song of the Islands' (excerpts), 1930]

In the same year, encouraged by Armstrong, the pianist and percussionist, Lionel Hampton – who became an early master of the instrument – used one slightly more prominently on Armstrong's 'Memories of You' – also recorded in 1930. The playing is still minimal but it's worth listening to this just for the sound – which, thanks to the recording technology of the time is pretty wild.



[Deagan Vibraharp]

[Louis Armstrong, 'Memories of You' (excerpts), 1930]

Hampton soon started to use harder mallets and pushed the instrument into soloing territory, developing a pianistic style than many others followed.

[Lionel Hampton, 'Flying Home' (excerpt), 1957]

But listen here to the young Milt Jackson, twenty years later, playing with the Modern Jazz Quartet. He's slowed the vibrato rate down to about three and a third revolutions a second – in contradistinction to Hampton's ten – and is using customised mallets to get a thicker, smoother sound. He doesn't play much, but he does exploit to the full what's unique about the vibraharp – its cloak of shimmer and mystery. This is from 'Regret', an extended arrangement by the pianist, John Lewis, of Bach's chorale prelude for organ, 'The Old Year Has Now Passed Away'.

[The Modern Jazz Quartet, John Lewis/J.S. Bach, 'The Old Year Has Now Passed Away', 1973]

The first art composer to use a vibraphone was Alban Berg – in his 1937 opera 'Lulu' – after which it became, like its siblings, a standard orchestral resource. Boulez was a notable convert, but probably the most visionary composition – just because of its intensification of the essence of vibraphonicity – is Karlheinz Stockhausen's 2002 'Strahlen', scored for ten tracks of tape – all derived from the vibraphone – and one live instrument. The tapes proceed in simultaneous layers at five different tempi selected mathematically from a menu of 30, 40, 53.5, 71, 95, 134, and 180 beats a minute. 'Strahlen', which means 'rays', constitutes the fifth scene of the opera 'Sonntag aus Licht'.

[Karlheinz Stockhausen, 'Strahlen' (excerpt), 2002]

Rock musicians also found integrated ways to use these instruments; here's Henry Cow in 1977. I'm afraid this is a very poor cassette recording made out in the room, but it's all we have because the piece was never officially recorded. You'll get the idea, though. This is from an untitled piece written by their bassoonist, Lindsay Cooper.

[Henry Cow, Untitled piece (excerpt), 1977]

And here's The Magic Band's Art Tripp with Captain Beefheart on 'The Clouds are Full of Wine, not Whiskey or Rye', recorded in 1970.

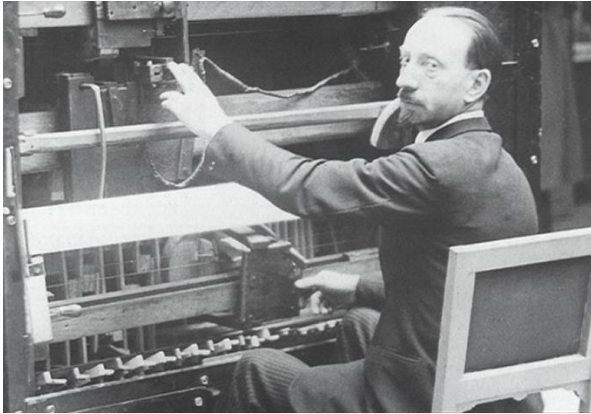
[Captain Beefheart and the Magic Band, 'The Clouds are full of Wine, not Whiskey or Rye' (excerpts), 1970]

And this is Frank Zappa's *Uncle Meat* theme, an inspired piece of vibraphone orchestration, from 1968.

[The Mothers of Invention, 'Uncle Meat Main Title Theme', 1969]

I choose the xylophone, but it would have been easy to approach a dozen other instruments in this way and trace their evolution and cross-pollination through the seemingly chaotic interminglings of chance, environment and need. 'This is how life climbs', to quote the great M.P. Shiel.

We see an imported instrument with no niche in the culture into which it falls, first take tentative hold – possibly through its homologous connection to the cimbalom, which is laid out and played in a similar manner – and, then once established, adapt to a variety of different cultural practices and social needs until, through a combination of chance and opportunity, it speciates both into the modern glockenspiel and the celesta. Centuries later, through its growing popularity, the orchestral xylophone opens the way for some of its more distantly related kin – out of which, eventually, a genuinely new instrument – the vibraharp – emerges. Meanwhile, alongside – and inextricable from – these successes lie the phantoms of the forgotten offers, failures, stepping-stones and intermediaries – the whole menagerie of hopeful monsters that failed to find a foothold. In just the first few years of the twentieth century – between the launch of the marimba



Luigi Russolo - Russolofono (1930)

[Luigi Russolo's Russolofono, 1930]

and the appearance of the vibraphone – that's about ten years – Deagan alone floated a marimbaphone, a tubaphone, a mabimba, the Deagan organ vibrato harp, a marimba celeste, an aluminium harp, the Deagan organ chimes, a tapophone and the Deagan songbells – none of which have survived, though many were arguably essential to those instruments that did.⁶

Wherever we look we'll find the same mechanisms, the same peaks and troughs and the same speciations, hybrids and extinctions – because this is the standard mechanism through which new instruments emerge, incrementally, out of old.

[Luigi Russolo, 'Il risveglio della città' (excerpts), 1927]

Adaptations and importations are not the only engines of change. More radical innovations come through instruments that artists and composers invent, not to improve on what's already there but, variously – to start again; to explore musical ideas that are unsupported by existing resources; to test new materials; to force new thinking – even, on occasion, just for the hell of it. Here are a few such cases.

Rethinking was the goal of the Futurist painter Luigi Russolo. Russolo understood the urban industrial soundscape to be a wholly new sensory environment – an environment permeated with a phenomenon he believed was qualitatively new to human experience – which he called *noise*. He thought that dynamos, motors, industrial machines, electrical power and the ceaseless pandemonium of city life had made the world not only louder but more rhythmically and *timbrally* complex – to the degree that existing instruments could no longer meaningfully address them. His plan was to redress that lack by creating from scratch an entirely new instrumentarium that was not drawn from – and did not relate to – the old. He wanted not only to give artists access to the kinds of sounds that defined contemporary life, but also to restore to them their power – *as artists* – to transmute lived experience into music. Here are two of the instruments, a *rombatore* and a *ronzatore*. In English a *rumbler* and a *buzzer*.

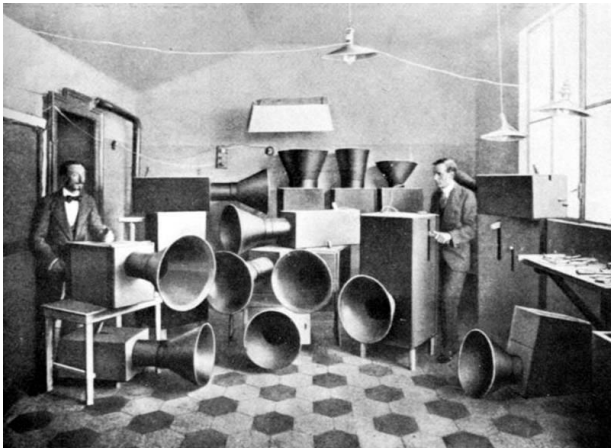
[Pietro Verardo, demonstration of *rombatore* and *ronzatore* (excerpts), 2017 (private recording, with thanks to Alessandro Monti)]

Russolo had already understood that *timbre* was the issue, not pitch; and that conventional instruments only had access to four basic categories of timbre: those produced by bowed instruments, by metal wind instruments, by wooden wind instruments and by percussion. These were useless, Russolo argued, in the face of a soundscape transformed by new technologies, new sensitivities and new materials. New *categories* of sound were needed now, and new instruments had to be invented to deliver them. And these would be real instruments, not mimetic effects. His goal – as he wrote at the time – was 'to give pitches to these diverse noises, regulating them harmonically and rhythmically' – because an 'Art of Noises should not limit itself to imitative reproduction'.

From one of the very few compositions by other composers that call for Russolo's noise machines, this is an excerpt from Franco Casavola's 'Il Mercante di Cuori', which was written for a theatre production, in 1927. It's an unreleased concert recording made in 2009 with reconstructed intonorumori.

[Franco Casavola, 'Il Mercante di Cuori' (excerpts), 1927]

First, Russolo rethought the problem. To do this he had to escape the gravitational field of inherited thinking and construct a new taxonomy of noises – for which there was no precedent. He identified six families – which he described in detail in his 1916 manifesto, 'The Art of Noises'. I'll just name the head of each family here: Roars, Whistling, Whispers, Screeching, Noise made by beating on different materials and the voices of animals and people.⁷ Next he faced a more difficult, problem: since wind, pipes, strings inadequate, creating new timbres would mean the identification of new technologies of sound production – in other words, a complete rethinking from the bottom up. For any normal person, that would have been a daunting prospect – but Russolo was a Futurist – and that's what Futurists did. So, with the help of his friend Ugo Piatti – also a painter – Russolo set to work – and their first instrument, a *scoppiatore* – or *burster* – with a slideable pitch range of two octaves, was publically demonstrated



[Russolo's Intonarumori]

in Modena just three months later. They went on to build 27 other varieties of instruments, collectively known as the intonarumori, which covered all five of the non-vocal categories of noise. In April 1914 – on the eve of war – the first 16-piece orchestra of intonarumori had its premiere in Milan, featuring three of Russolo's compositions – or, as he preferred to call them: 'networks of noises'. There was the customary riot, and then a short European tour before war put an end to normal life. Russolo survived and continued his musical researches – and although Edgard Varèse and Igor Stravinsky expressed public interest in his instruments, neither composed anything for them. In fact, no meaningful support came from the musical world at all. And then the instruments themselves were lost in the chaos of World War Two. Also lost was Russolo's less discussed but, arguably, more prescient invention, the noise harmonium. The prototype was completed in 1927 and could produce all twelve basic categories of noise – centrally controlled from a standard keyboard. A year later, an updated version was installed in Studio 28, in Paris, and used mainly to accompany silent films. No recordings were made and the instrument is now lost.

[Pietro Verardo and Chris Cutler, 'Il piacere è tutto mio' (excerpt), 2018]

What did they look like and how did they work? Well, they didn't look much like musical instruments: 'Externally the noise instruments take the form of boxes of various sizes', Russolo wrote, 'at the front end a horn serves to collect and reinforce the noise-sound; and behind is a handle to produce the motion that excites the noise'. Pitches and the portamenti were controlled by a lever on the top of the box.

Inside, the mechanisms – at least of the types for which plans or drawings exist – were highly unconventional, many using a combination of the hurdy-gurdy principle – that's where an abrasive wheel excites a string or some other material – and the friction drum – which is where a variously stretched string is attached to membrane and amplified, in this case by direct contact with an acoustic horn.⁸

Like Arseny Avraamov, whom we met in PROBES #26, Russolo was a visionary, and his ideas prefigured and anticipated developments that didn't enter mainstream thinking until some thirty years later with the birth of musique concrète. Today no-one thinks twice about them. I suppose his misfortune was to have been in the wrong profession at the wrong time to be able to have any real chance of reversing the oil-tanker of aesthetic thought alone. A lot of things worked against him: first, he was a painter, in the wrong world; second, his instruments were too alien to attract even experimental composers; third, his music didn't circulate on recordings – so it remained virtually unknown; fourth, only a handful of people ever wrote for them, so there's no serious repertoire; fifth, even the instruments were lost. Still, so much has been built on the back of his visionary thinking that, in spite of the seeming marginality of his achievements, he must be counted one of the Newtonian giants, on whose shoulders contemporary aesthetic thinking rests.

Plans for some of the intonarumori exist and a few of the models have been reconstructed, but there's no set of them and the noise harmonium is not amongst them. The excerpts heard in this programme, with the exception of Russolo's surviving 1927 recording, are all taken from a private recording made by Pietro Verardo at his home in Venice on some of the duplicate instruments he built for the 2009 Venice Biennale.

[...taxi arrives]

In the next programme we'll be looking at more invented instruments.

[Gregorio Paniagua, 'Anakrousis', 1978]

¹ Published in parts between 1620 and 1640.

² In his 'Spiegel der Orgelmacher und Organisten', where it is called 'hültze glechter', roughly 'wooden clatter'.

³ The instrument he used was called a carillon and had a range of two and a half octaves.

⁴ The original was obviously a set of bells. These were eventually replaced by another invention, tubular bells.



5 We do know that the early folk xylophone was played, like the cimbalom, with curved sticks...

6 Of Schuler's improvements to the vibraphone, for instance, the pedal came from the Deagan organ vibrato harp and the aluminum bars from the Deagan song bells.

7 The full list in the Manifesto reads:

1 Roars, Thunderings, Explosions, Hissing roars, Bangs, Booms

2 Whistling, Hissing, Puffing

3 Whispers, Murmurs, Mumbling, Muttering, Gurgling

4 Screeching, Creaking, Rustling, Buzzing, Crackling, Scraping

5 Noises obtained by beating on metals, woods, skins, stones, pottery, etc.

6 Voices of animals and people, Shouts, Screams, Shrieks, Wails, Hoots, Howls, Death rattles, Sobs.

These are the most basic and fundamental noises; other noises are associations and combinations of these.

8 For more on Russolo, and more sound examples, check PROBES #4.

02. Notes

On length and edits.

The purpose of these programmes is to give some practical impression of the probes we discuss. This necessitates for the most part extracting short stretches of music from longer wholes, which, of course, compromises the integrity and disrupts the context inherent in the original works. I have also, on occasion, edited different sections of a longer work together, better to illustrate the points under discussion. So the examples played in the programmes should not be confused with the works themselves. Wherever the word (excerpt) appears after a title in the programme transcript, this indicates that what follows is an illustration, not a composition as it was conceived or intended. If something catches your ear, please do go back to the source.

Notification

If you want to be notified when a new probe goes up, please mail remegacorp@dial.pipex.com with subject: Probe Me.

03. Acknowledgments

Special thanks to David Petts, Yumi Hara, Alessandro Monti and Piero.

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